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PIR

PHOTOGRAPHIC INTELLIGENCE REPORT

[REDACTED]
ANALYSIS OF SOVIET

TYPE III-D ICBM SITES

Declassification by NIMA/DoD

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CIA/PIR 61089

DATE Jan 1966
COPY 90
PAGES 49

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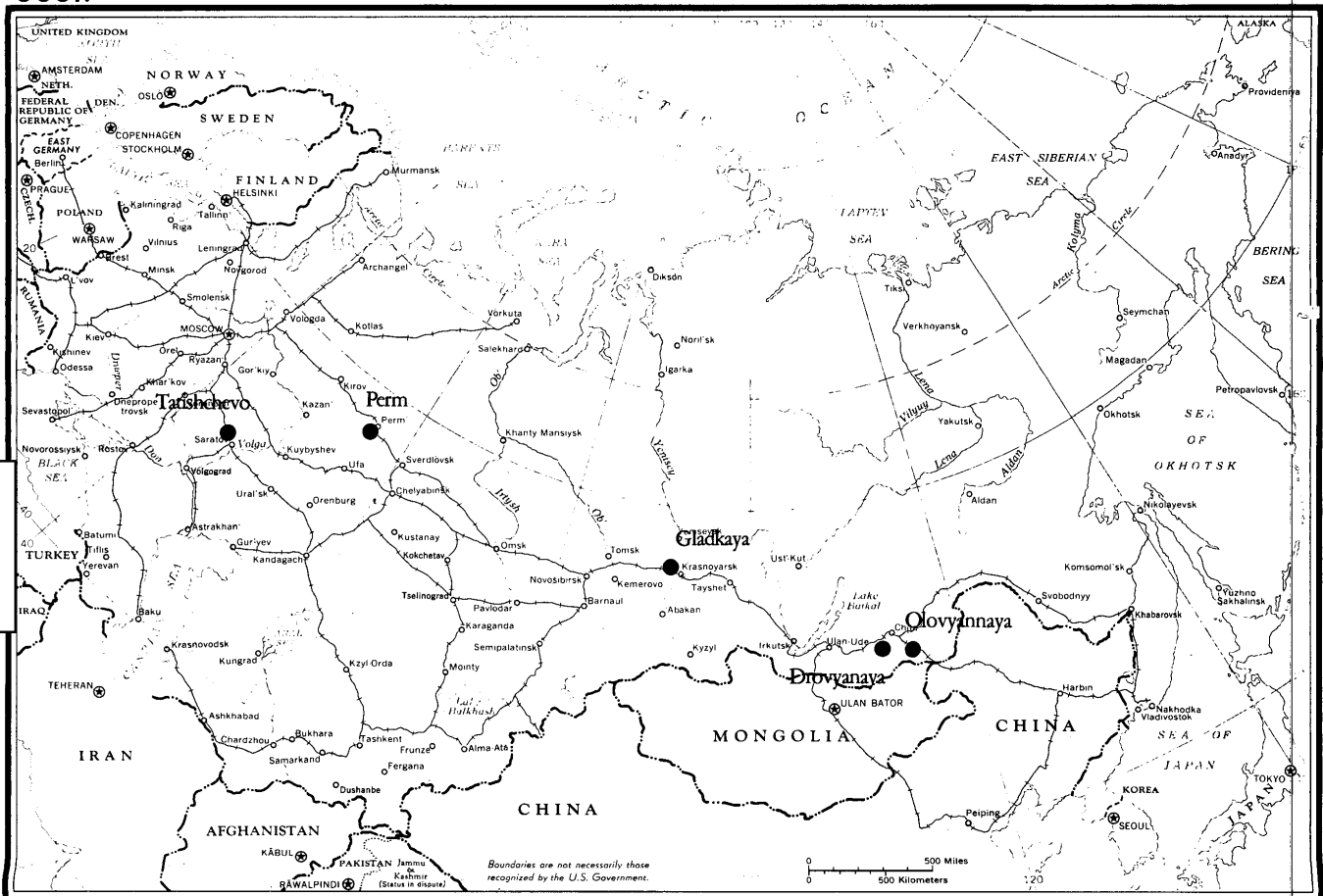
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USSR



DEPLOYED TYPE III-D ICBM COMPLEXES

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ANALYSIS OF SOVIET TYPE III-D ICBM SITES

A total of 134 confirmed and probable small single silo launch sites have been identified at five locations in the USSR since deployment of the Type III-D ICBM sites was initiated early in [redacted]. They are located at four of the Soviet SS-7 ICBM launch complexes and at one launch complex which was originally started as a hardened SS-5 ICBM complex and later abandoned (Figure 1).

This study will present a photographic chronology of the development of the Type III-D sites; provide pertinent mensural data; and analyze construction timing (Figure 2). The construction stages used have been developed jointly by IAD and CIA/ORR Forces Division analysts and have been previously applied in a number of IAD reports relating to Soviet single silo deployment.

The following tabulation lists the geographic coordinates of these complexes, the number of sites carried as confirmed or probable by CIA/IAD at each complex through [redacted] and the negation and first seen date of the first Type III-D site at each installation.

<u>Complex</u>	<u>Location</u>	<u>No. of Sites</u>	<u>No. of Groups</u>
Drovyannaya	51-32N 113-01E	20	2
Gladkaya	56-05N 092-13E	18	3
Olovyannaya	50-48N 115-50E	48	5
Perm	57-42N 056-19E	16	2
Tatishchevo	51-41N 045-33E	<u>32</u>	<u>4</u>
		134	16

In addition to the above, the sites so far identified at Perm may actually represent elements of three groups and with the identification of six control sites at Olovyannaya, the possibility arises that six groups may be under

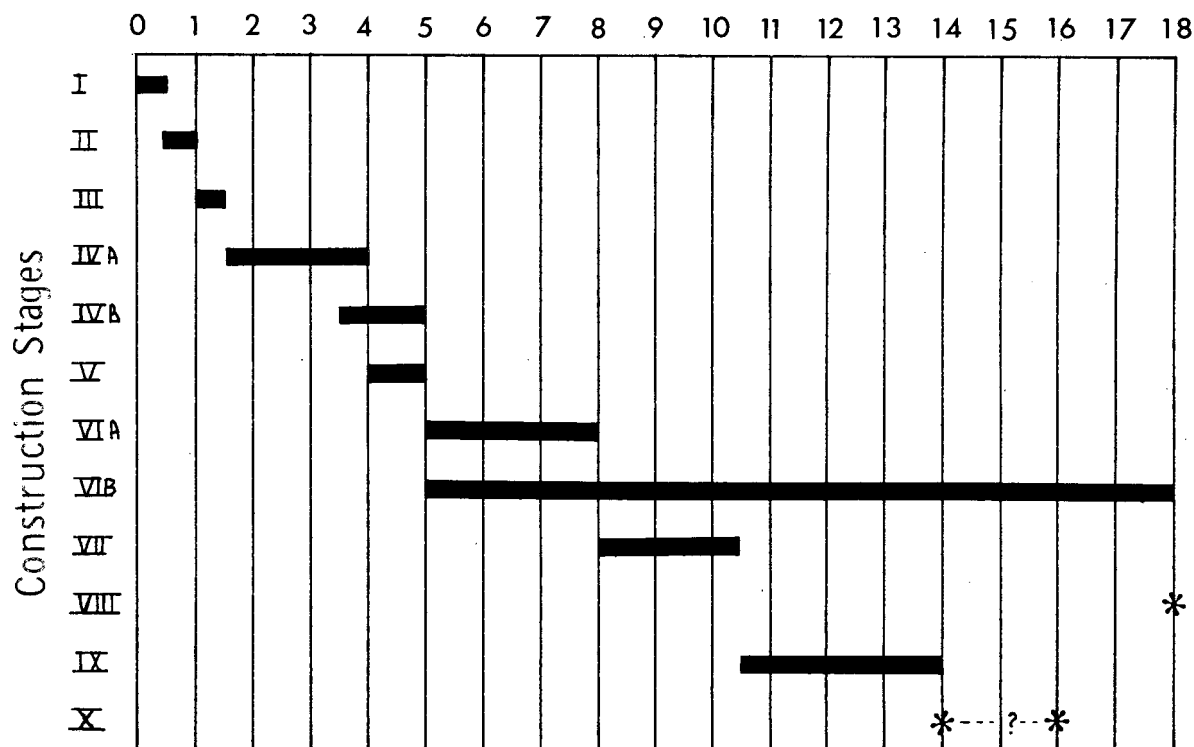
* Only a cursory assessment of Missions [redacted] has been completed to date.

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CONSTRUCTION TIMING, SOVIET TYPE IIID ICBM SITES Time in Months



DESCRIPTION OF CONSTRUCTION STAGES

- I CLEARING AND GRADING
- II OPEN CUT EXCAVATION
- III CORING VISIBLE
- IVA RAMPS / FORMS UNDER CONSTRUCTION FOR SILO
- IVB CLEARING AND EXCAVATION FOR GUIDANCE AND CONTROL
- V SILO COMPLETE TO SURFACE LEVEL
- VIA INSTALLATION OF RAIL-LIKE OBJECTS
- VIB LEVEL ACCESS ROAD PATTERN NOT WELL DEFINED
- VII CONTROL AND GUIDANCE UNDER CONSTRUCTION
- VIII ROAD PATTERN WELL DEFINED. ENVIRONMENTAL COVER OFTEN VISIBLE OVER SILO
- IX CONTROL AND GUIDANCE COMPLETED
- X ROAD PATTERN COMPLETE. SURFACING OF ROAD AND INSTALLATION OF SILO DOOR
- X SITE COMPLETE

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construction there instead of the five presently identified. There is also the possibility that a third group may be under construction at Drovyanaya, but not as yet identified and that a fifth group might have been started at Tatishchevo since the last effective coverage.

The differences in design and construction of these silos necessitates a redefinition of the construction stages applied to the Type III-C large single silo ICBM sites. The first five construction steps are followed in the same sequence, but due to the limitations of the photography, are often interpretable only in hindsight. In such cases, it then becomes a matter of individual analyst judgment, with timing a major factor in the assignment of a stage of construction. As was the case with the Type III-C sites, there is a variation among sites in the order of appearance of some features. These include such things as fencing, the small arched building at the fence line, and the control elements. There is also a somewhat marked difference between the pace of construction of the first group at most of the complexes and that of succeeding ones--the first groups having proceeded at a slower pace. Whether this difference may be ascribed to weather conditions, to some unknown factor, or is merely a reflection of experience can only be a subject of speculation. The variability among these groups in timing was most marked from Stage VI-A onwards. The times given for the status of each site pictured, therefore, are averages (weighted slightly to the shorter time span) and do not necessarily reflect the precise timing of the individual site.

With their inherent small size, about 10 to 15 acres compared to about 90 acres for the Type II soft sites (Figure 3) and because of the lack of identifiable ICBM launch site support facilities, the individual Type III-D sites have, especially early in their construction cycle, presented a problem in identification. A few sites have been visible on photography ten to twelve times over a period of twelve to sixteen months before identification.

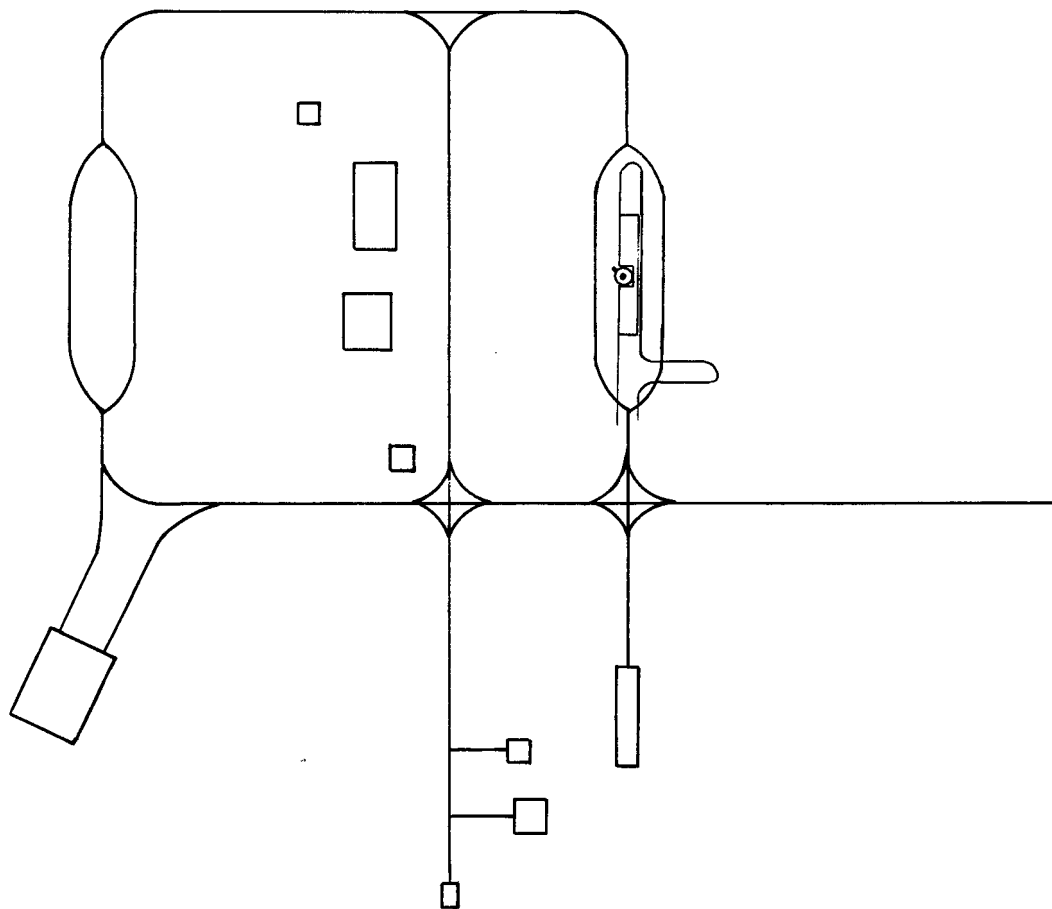
Photographic coverage of the Type III-D complexes was generally rather poor in [redacted]. Had it not been for several good quality [redacted] missions, few details of the construction history of these sites would presently be known, and at least one complex (Perm) would not have been confirmed until [redacted]. Indeed, deployment of Type III-D sites at Perm was not confirmed until the second [redacted] coverage of them was obtained. [redacted] coverage of these sites was received, but they could not be confirmed because of lack of stereo, snow cover, and obliquity.

Generally speaking, a discussion of the [redacted] coverage of the Type III-D sites lends itself to a breakdown by quarters. During the first quarter of [redacted] there were [redacted] missions of good quality photography, but snow cover limited interpretation of details and made it almost impossible to confirm a new site which had been under construction for four months or less. In the second quarter,

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SKETCH (TO SCALE) ILLUSTRATING RELATIVE SIZES OF A
TYPICAL TYPE II B AND TYPE III D ICBM LAUNCH SITE

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X1 coverage over these complexes was greatly reduced. The quality was such that the known sites could be located but not interpreted, and new sites could not be recognized unless in an advanced stage of construction. During the third quarter, complexes were covered on photography whose quality was, if anything, poorer. In the last quarter, only one complex was covered until the last week in [] The quality had improved substantially, but snow cover again became a limiting factor. This discontinuity of coverage and the overall poor conditions for interpretation of these small features have left gaps which are critical to a thorough understanding of the construction cycle of the Type III-D sites. The following table is a compilation of the number of [] missions by quarter, the number of passes over the USSR, the number of passes over the Type III-D complexes, and the number of times that Type III-D complexes were observed.

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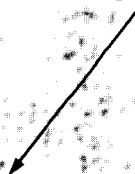
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TYPE III B ICBM LAUNCH SITE

Scarring and Track Activity
At Site Location



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CONSTRUCTION STAGES

STAGE I -- CLEARING AND GRADING

(Time in Stage - 0 to 2 Weeks)

The time for clearing and grading will vary between very narrow limits, depending upon the nature of the location chosen for the site. In open agricultural country, this may be a matter of a day or two. In forested areas, pre-existing clearings-either natural or the result of lumbering operations-are often utilized (Figure 4). Because of the small areal extent of the sites, two weeks should probably be regarded as a maximum figure.

Since no site support facilities are built as is normally the case with the Type III-C sites in this stage, and because the initial activity can easily be confused with lumbering or agriculture, positive identification of a site can never be made during this stage.

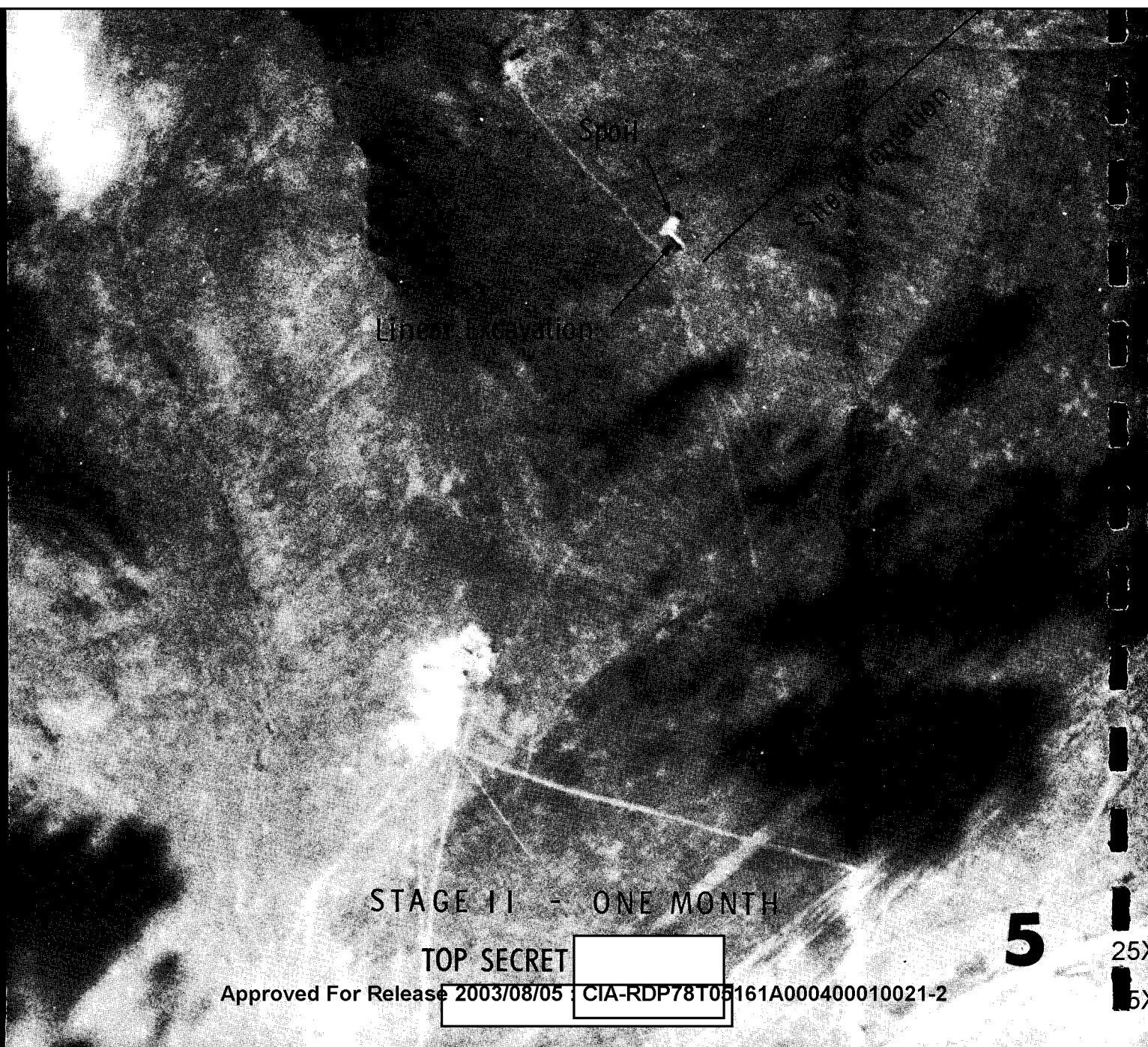
STAGE II -- OPEN CUT EXCAVATION

(Time in Stage - 2 Weeks)

The amount of initial excavation for a Type III-D site is minimal, and apparently varies with local soil conditions. In some instances, a shallow, roughly circular hole is dug. In others, a linear cut is made (Figure 5). The latter is normally only slightly wider than necessary to accomodate the headworks, and is perpendicular to the ultimate orientation of the site. In either case, however, the excavation is so small and nondescript that again it is almost always not definitive in the positive identification of a site. Exceptions can be made on [] or good quality [] photography but only at known groups where spacing between sites has been established and a spoil pile is discernible beside the excavation, preventing it from being confused with a small borrow pit.

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STAGE II - ONE MONTH

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STAGE III -- CORING VISIBLE

(Time in Stage - 2 Weeks)

The combination of the small size of the coring, minimal amount of time taken to core, lack of continuity in coverage, and small scale, generally poor quality photography, has not provided good photographic examples of this stage. They are of such a nature that no confident measurement can be given of the coring of any sites with the typical Type III-D configuration. Good quality coverage of Launch Areas G-8 and G-9, Tyuratam Missile Test Center, in this stage, however, infers a diameter for the coring of approximately 15 feet. Spoil from the coring is usually piled next to that taken from the excavation, forming a second small, rectangular or tear-shaped mound near the hole (Figure 6).

STAGE IV-A -- SILO UNDER CONSTRUCTION

(Time in Stage - 2½ Months)

During the time the silo is being constructed, details are obscure. There is little activity taking place that can be observed. The best photographic coverage to date during this stage has, unfortunately, been monoscopic or with snow cover. Much track activity is visible around the coring; fencing normally becomes apparent; and clearing and excavating for a small concrete arched roof building is observed at the fence line (Figure 7). The association of all or most of these factors, together with proper spacing, is usually the earliest point at which a site is confirmed. The last thing to be done before the silo headworks is completed to surface level is apparently the addition of a small appendage, probably for personnel access. There are indications that this appendage extends to the interior of the silo since prior to its addition, at least one site has been seen with a break extending completely through the silo headworks (Figure 8).

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TYPE III D ICBM LAUNCH SITE

Spill
Ring Visible

An aerial photograph showing a launch site. A bright, circular feature is labeled 'Ring Visible' with an arrow. To its left, a dark, irregular area is labeled 'Spill' with an arrow. The surrounding terrain is dark and textured, with some lighter patches. A large, bright, curved line is visible in the lower left quadrant of the image.

STAGE III - ONE AND ONE HALF MONTHS

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TYPE III D ICBM LAUNCH SITE

Clearing For Small Concrete
Arched Roof Building

Silo Not At Surface Level

STAGE IV A - THREE MONTHS

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TYPE III D ICBM LAUNCH SITE

Fencing

Silo At Surface Level With
Break In Headworks

STAGE IV A - THREE AND ONE HALF MONTHS

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STAGE IV-B -- CLEARING AND GRADING FOR GUIDANCE/CONTROL(Time in Stage - $1\frac{1}{2}$ Months)

At a variable time in the construction cycle of the control site, but usually about three and a half months from its start, several additional excavations become apparent (Figure 9). A rectangular excavation which will house a part of the control structure appears within the fenced area about 500 to 600 feet from the silo. Adjacent to this, and seemingly without any particular orientation, a narrow linear excavation for an arched roof building is made. Outside the fenced area, shallow excavations for two large and one small arched roof buildings begin to appear.

STAGE V -- SILO COMPLETE TO SURFACE LEVEL

(Time in Stage - 1 Month)

After the probable personnel access has been added to the side of the silo headworks on an orientation which is consistently 45 degrees from the ultimate site orientation, little apparent change can be detected over a period of about a month (Figure 10). The consistency of the relationship between the probable personnel access and the orientation of the site, which is also the expected direction of launch, suggests that collimation equipment may be installed on this side.

Construction continues on the small concrete arched-roof building at the fence line.

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TYPE III D ICBM LAUNCH SITE

Excavations For Control Bunker
and Arched Roof Buildings

STAGE IV B - THREE AND ONE HALF MONTHS

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TYPE IIID ICBM LAUNCH SITE

Silo Headworks Complete
With Appendage

Excavation For Small Concrete
Arched Roof Building

Scarring

STAGE V - FOUR AND ONE HALF MONTHS

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TYPE III D ICBM LAUNCH SITE

Rail - like Objects

Small Concrete Arched Roof
Building Under Construction

Excavation For Small Building
(Outside Fence Line)

STAGE VI A - FIVE AND ONE HALF MONTHS

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STAGE VI-A -- INSTALLATION OF RAIL-LIKE OBJECTS

(Time in Stage - 3 Months)

It is at this time that similarity of construction procedures with the Type III-C sites ends and the activity at the Type III-D sites begins to center almost exclusively (at least externally) on the build-up of the level access road. The beginning of Stage VI-A is marked by the appearance of three dark linear traces or rail-like objects. These are possibly rows of footings which extend outward from the silo headworks into the original excavation at an angle perpendicular to the orientation of the site (Figure 11). It is toward this direction that the door will probably slide. Their appearance remains unchanged until late in Stage IX. Also at this time a small excavation is frequently observed just outside the fence line (Figure 11). On [] a very small structure or earth mound is seen at about this location at several sites.

The irregular scarring around the site soon changes into a markedly linear pattern as a result of clearing and grading for the level access road, although the final road configuration cannot yet be determined (Figures 12-14). Cabling ditches appear connecting the sites in a group near the end of this stage.

STAGE VI-B -- GUIDANCE/CONTROL UNDER CONSTRUCTION

(Time in Stage - 12½ Months)

After the initial excavations are made, work proceeds on the arched roof structures and a portion of the control building (Figures 15-16). The presence of one of one of these arched roof structures near the control bunker is unique to the Type III-D system, as is the construction of the control bunker in two parts, connected by a passageway (Figures 17-19). The last and smallest part to appear is built flush with the surface while the first is higher and, at least in some cases, extends above surface level (Figure 20). The thickness of these walls cannot be determined from available coverage. Other pertinent mensural data appears on Figure 21.

Ditching for the legs of the interferometer appears only after construction of the control buildings is well advanced (Figure 22). The legs of the interferometer are identical to those at the Type III-C control centers. Two 400-meter long ditches of undetermined depth and estimated to be [] feet wide are extended at right angles, one always oriented toward the expected direction of launch. At 50 meter intervals, a notch approximately [] square is made in each leg, probably to accommodate a support for the wave guide antenna. These legs, together with

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TYPE III D ICBM LAUNCH SITE

Linear Scarring
(Clearing For Level Access Road)

STAGE VI A - SIX MONTHS

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TYPE III D ICBM LAUNCH SITE

Little Apparent Change
In Level Access Road

STAGE VI A - SEVEN MONTHS

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TYPE III D ICBM LAUNCH SITE

Environmental Cover

Little Apperent Change
In Level Access Road

STAGE VI A - EIGHT MONTHS

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TYPE III D ICBM LAUNCH SITE

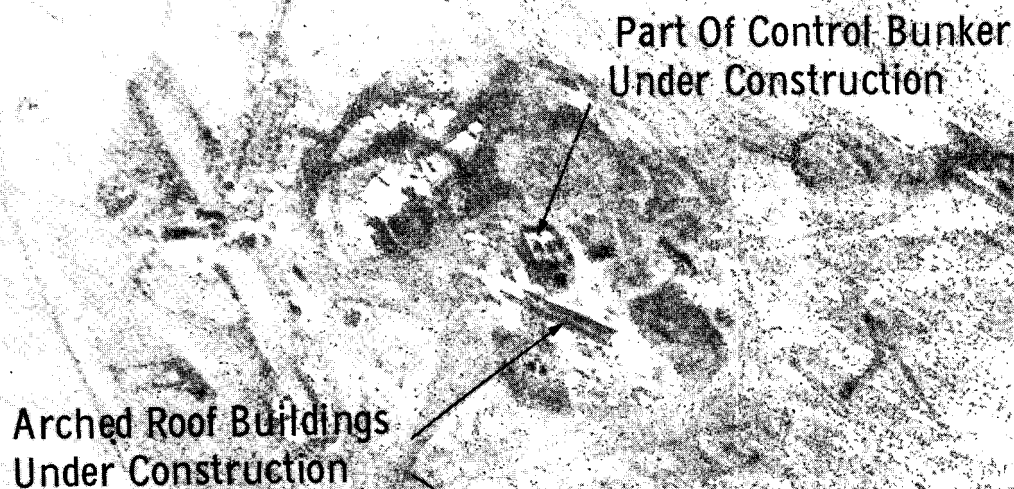
Arched Roof Building
Under Construction

STAGE VI B - FOUR AND ONE HALF MONTHS

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TYPE III D ICBM LAUNCH SITE



Part Of Control Bunker
Under Construction

Arched Roof Buildings
Under Construction

STAGE VI B - SIX AND ONE HALF MONTHS

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TYPE III D ICBM LAUNCH SITE

Arched Roof Buildings
Essentially Complete

Second Part Of Control Bunker
Under Construction

STAGE VI B - SEVEN AND ONE HALF MONTHS

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TYPE III D ICBM LAUNCH SITE

Control Bunker
Near Completion

STAGE VI B - NINE MONTHS

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TYPE III D ICBM LAUNCH SITE

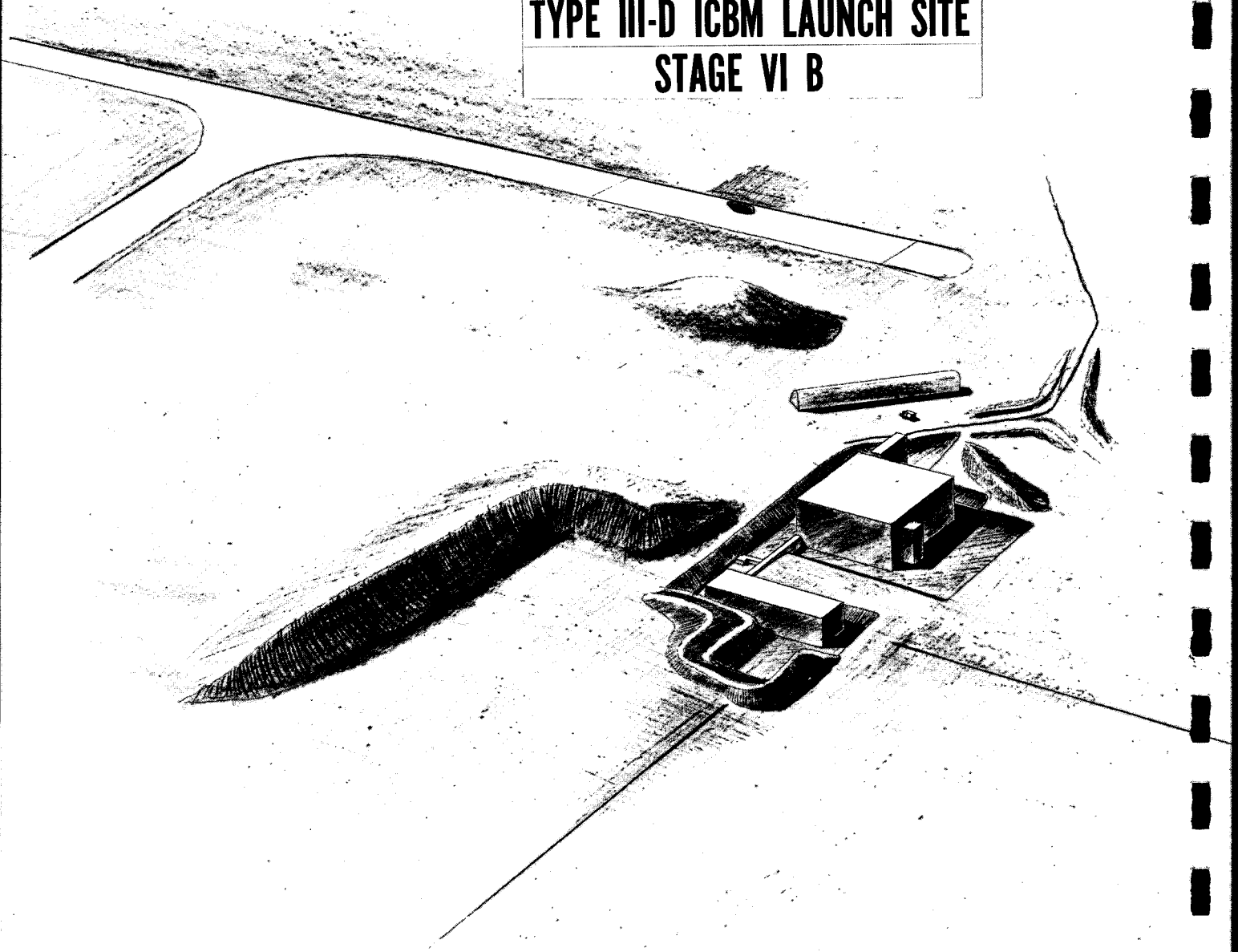
Control Bunker Outwardly Complete

STAGE VIIB ELEVEN AND ONE HALF MONTHS

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**ARTISTS CONCEPT
TYPE III-D ICBM LAUNCH SITE
STAGE VI B**

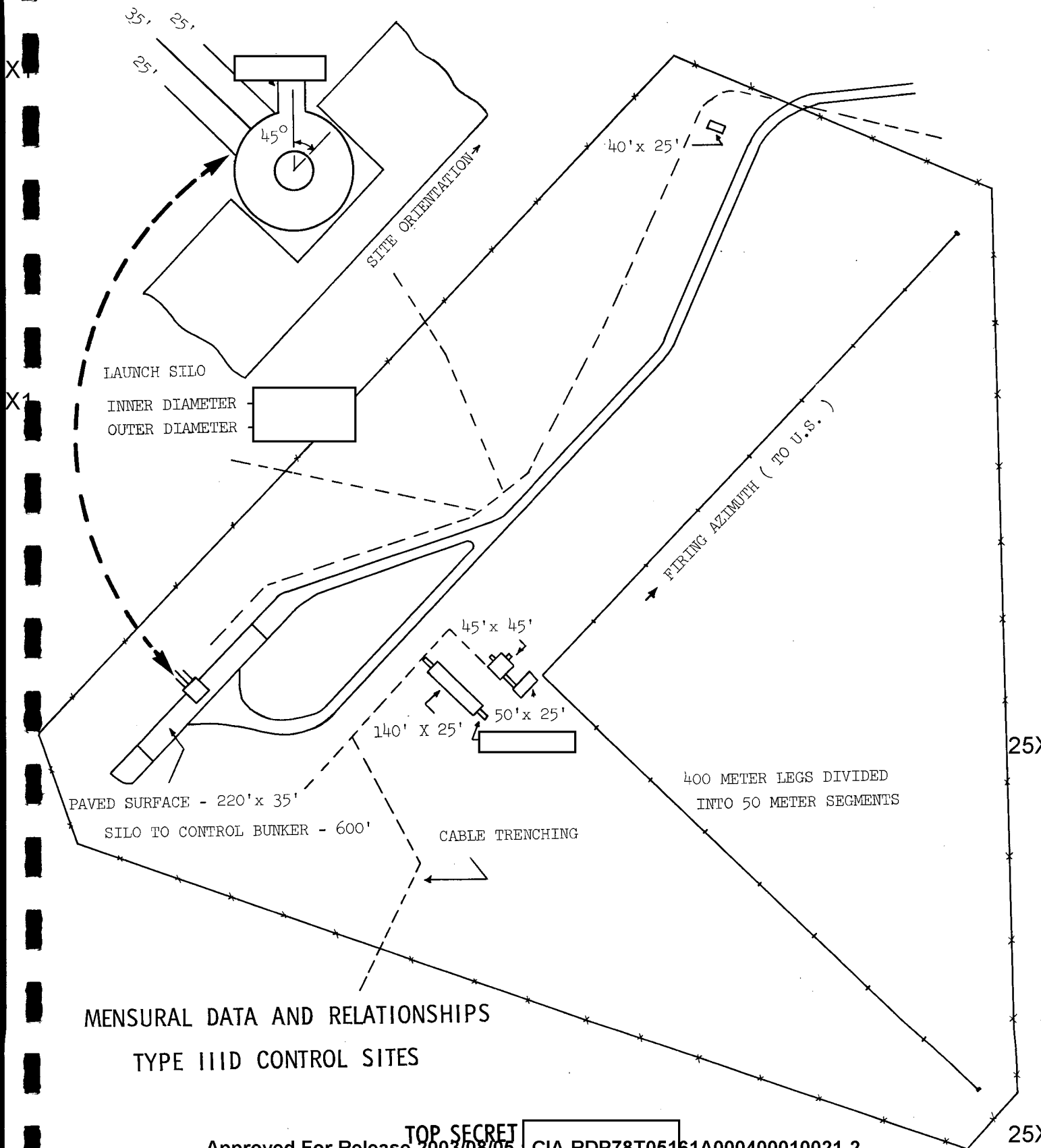


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TYPE III D ICBM LAUNCH SITE

Notches At 50 Meter Intervals

Ditching For Interferometer Legs

STAGE VI B - THIRTEEN MONTHS

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the control structures, are then backfilled. The arched roof structures are earth mounded.

Although the support facilities at the control sites are not within the scope of this report, it should be noted that all are essentially similar with the exception of those at Launch Site F-1, Olovyanaya, where there is a marked difference in size of the buildings. The proximity of this site to the complex support facility and transfer point suggests that it may possibly be a command control center for all groups at the complex. If so, a similar arrangement should be expected at the other Type III-D complexes.

STAGE VII -- ROAD PATTERN WELL-DEFINED

ENVIRONMENTAL COVER OFTEN VISIBLE OVER SILO

Over a period of about three months, the level access road is gradually built up (Figures 23-24). Work continues within the silo or silo headworks, as the area around the silo normally shows signs of considerable activity when the sites are snow covered. During this time an environmental cover often appears over the silo, particularly during the winter months. Also a dark circular ring is sometimes observed near the headworks both in Stages VII and IX (Figure 24). This ring has an outer diameter of [] an inner diameter of [] and is similar to those seen at Launch Areas G-8 and G-9, Tyuratam Missile Test Center, on []

The orientation of these deployed sites, consistent within a complex, is such that the long axis of that part of the level access road which contains the silo is parallel to that leg of the interferometer whose azimuth is directed toward the U.S. Only two exceptions are known--L-2 and L-3 at the Tyuratam Missile Test Center. The significance of these exceptions has not been established.

STAGE VIII -- GUIDANCE/CONTROL COMPLETED

Only at Launch Area K-3, Tyuratam Missile Test Center, has an interferometer for a Type III-D site been observed after completion (Figure 25). All of the elements of the interferometer and associated structures are completely back-filled or earth covered so that little surface expression is apparent. About twelve and one half months were required for completion of these facilities at Launch Area K-3. Since construction at the range has usually proceeded at a faster pace than at the deployed complexes, a fourteen and one half month average is estimated for the latter.

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TYPE III D ICBM LAUNCH SITE

Cable Trenching

Level Access Road Under Construction
Site Configuration Apparent

STAGE VII - NINE MONTHS

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TYPE III D ICBM LAUNCH SITE

Dark Circular Ring

Level Access Road
More Sharply Defined

STAGE VII - TEN MONTHS

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TYPE III D ICBM LAUNCH SITE

Control Bunker and Interferometer
Legs Backfilled

Arched Roof Building
Earth Mounded

STAGE VIII - FOURTEEN AND ONE HALF MONTHS

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STAGE IX -- LEVEL ACCESS ROAD COMPLETESURFACING OF ROAD AND INSTALLATION OF SILO DOOR

(Time in Stage - 3½ Months)

Over a period of a month, once the level access road is complete (except immediately around the headworks, which is the last to be completed) the level access road is paved about 110 feet to each side of the silo headworks. Upon completion of paving a notch as wide as or slightly wider than the silo is left and backfilling over the rail-like objects begins (Figures 26-28).

At this point in time the level of the silo headworks often gives the impression of being somewhat lower than the surface of the level access road, and the dark circular ring can be seen resting on a flat cover which obscures the interior of the silo. More or less simultaneously, an excavation is made adjacent to the level access road, usually on the side away from the silo appendage and always (up to this time) to the rear of the site, i.e., away from the expected direction of fire. A small structure, about [] square is emplaced in this excavation, its roof being flush, or nearly so, with the surface of the ground (Figure 28). Upon completion, the structure is earth mounded to the height of the access road (Figure 29). The mound may be conical or be rectangular and extend to the level access road, forming one of a number of protrusions. Its position also varies slightly. The small concrete arched roof building is completed during Stage IX, then earth covered. It is readily identifiable as a high conical mound near the fence line, about 65 feet in diameter at the base. An access can be seen on good quality [] photography and cable ditching has been seen connecting this structure directly with the silo headworks. The exact function of this structure remains undetermined, although it may house equipment such as an auxiliary generator. The last elements (thus far observed) to make their appearance are: the build-up over the area of the rail-like objects, which seems to take a form which approximates one-quarter of a circle built up flush with the level access road and extending about 45 feet out; and two conical mounds at the end of the level access road seen at Olovyannaya Launch Sites D-3, D-4, D-5, D-7, and possibly at Olovyannaya Launch Site E-4 and Tyuratam Missile Test Center Launch Site L-6. At Olovyannaya the mounds are apparently usually placed in a definite relationship (about 45 degrees) to one side or the other of the level access road and forward of the silo (Figures 29 and 30). Diameters of these mounds at the base are approximately 40 feet [] feet, respectively. Thus far the smaller mound has always been found to be closest to the level access road. At Perm Launch Site G-5, two mounds about [] feet in diameter at the base are also seen, one on each side of the level access road. It is not known if these are the same features as seen at Olovyannaya. The discontinuity in coverage already referred to has precluded identification of what, if anything, these features cover. No excavation has been seen at any site

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TYPE III B ICBM LAUNCH SITE

Level Access Road Completed

Break In Level Access
Road Around Silo

STAGE IX - TEN MONTHS

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TYPE III D ICBM LAUNCH SITE

Paving Of Level Access
Road Underway

Interior Of Silo
Visible

STAGE IX - ELEVEN MONTHS

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TYPE III D ICBM LAUNCH SITE

Paving Of Level Access
Road Almost Complete

Rail-like Objects
Mostly Obscured

Silo Interior Obscured

Area Around Silo Backfilled

Small Building
In Excavation

STAGE IX - ELEVEN AND THREE FOURTH MONTHS

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PEPPERBOM LAUNCH SITE

Protrusion From
Level Access Road

Earth Mounds Over

Earth Mound Over Small
Concrete Arched Roof Building

Earth Mound Over
Small Building

POSSIBLE STAGE X - FOURTEEN MONTHS

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TYPE III D ICBM LAUNCH SITE

Earth Mound Over Small
Concrete Arched Roof Building

Build-Up Over
Ball-like Objects

Earth Mounds

Protrusions From
Level Access Road

POSSIBLE STAGE X - FOURTEEN MONTHS

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at these positions, but their similarity to each other and a certain consistency of placement argue for a functional use. One possibility is that they may cover tanks, although, if so, it is difficult to explain their late appearance. Their size suggests that anything underneath must be relatively small; their low height--lower than the level access road--suggests complete burial.

The installation of the silo door has not been observed, although a possible door has been identified at Gladkaya Launch Site F-2*. The possibility exists that it may finally rest in place flush with the surface of the level access road and be extremely difficult to detect.

STAGE X -- SITE COMPLETE

The final site configuration seems dictated by terrain considerations, since many variations on a Y, T, or L-shaped level access road have been observed. A number of conical earth mounds and protrusions from the level access road, possibly covering other small buildings, will form part of the site signature. The variability of placement of various of these features combined with variability in layout of the level access road makes it rather unlikely that any two sites will have exactly the same signature. The initial assessment of an average of 14 months for completion is still believed to be valid, although the addition of features not previously identified raises the possibility that 16 months may eventually be accepted as a better figure. It is also probable that the Soviets could, if they wished, rush these sites to completion in a significantly shorter time.

SUMMARY AND CONCLUSIONS

1. It is certain, due to the lack of coverage and recent poor quality photography, that a number of Type III-D sites within known groups are presently under construction and have not yet been identified. It is probable that more groups than presently identified are under construction, and the possibility also exists that Type III-D sites may be deployed elsewhere in the USSR and be as yet undetected.

2. One control center, similar, but not identical to those at the Type III-C sites, will serve a group of ten sites. These ten sites are interconnected by cabling and normal considerations of redundancy would lead to the expectation that the groups will ultimately be interconnected with cables. Each control site will have an L-shaped interferometer used for control and/or impact prediction purposes.

* See addendum, page 15

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TYPE III D ICBM LAUNCH SITE

Unique Site Configuration

Up Over
Windlike Objects

Earth Mound Over
Small Building

70' x 20' Building
Possibly Arch Roofed

Earth Mound Over Small
Concrete Arch Roofed Building

Medium Sized
Building

POSSIBLE STAGE X - FOURTEEN MONTHS

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3. Evidence as to the type of missile system to be deployed at the Type III-D sites is inconclusive at this time. To date, there has been no solid fueled test program identified at Tyuratam Missile Test Center. To the contrary, the liquid fueled SS-11 has been backtracked to the area of the Range Head where the small silos have been constructed. This missile system has been developed in a time frame compatible with the deployment of the Type III-D silos. From a purely photographic viewpoint, however, there is much evidence in favor of a solid fueled vehicle at these sites as follows:

a) The simplicity of design of the site. A comparison of Stages II, III, IV-A, V, and IX, with the Type III-C sites as shown in CIA/PIR-61028 (Analysis of Soviet Type III-C ICBM Launch Sites) clearly demonstrates the marked differences between the Type III-D sites and those estimated to be constructed for the liquid-fueled SS-9.

b) The diameter of the silo is small, only [REDACTED] There has been no indication that exhaust vents are present at the silo even using isodensimetric techniques; indeed, the design of the silo headworks is such that the installation of any venting is seemingly impractical. The technical feasibility of launching a liquid-fueled missile from such a silo is questionable.

c) No fueling vehicles have been detected at Launch Areas G-5 and G-6, Tyuratam Missile Test Center, (considered to be the probable R and D soft site prototype); at Launch Areas G-8 and G-9, Tyuratam Missile Test Center (considered to be the R and D hard site prototype); or at Launch Area K-3, Tyuratam Missile Test Center, (considered along with the 'L' group, Tyuratam Missile Test Center to be the operational prototype). However, it is possible that a prepackaged liquid system may be involved.

d) There are indications that these sites will probably not be manned. Only one small, semi-buried structure, 40 by 25 feet and one very small building completely buried are associated with each silo. Additional structures are associated with the manned control center.

e) There are three areas west of Launch Complex G, Tyuratam Missile Test Center which are very possibly solid related. Launch Complex G, is closely associated with the Type III-D program through Launch Areas G-5 and G-6, G-8 and G-9, and the 'L' group.

f) There exist at six locations in the Soviet Union--Perm, Krasnoyarsk, Kemerovo, Biysk, Sterlitamak, and Kamensk-Shakhtinskiy--large production facilities for the manufacture of solid-propellant motors. Their capacity appears to exceed that required for the manufacture of SAM's, FROGS or known ballistic systems. Associated with each are large scale testing facilities which appear to be capable

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of handling large solid motors. All the test facilities were built subsequent to [] and the earliest evidence of testing observed was in []. Additions are still being made to all six of these locations.

g) The presence of the SAVAGE in the [] parade--although doubt certainly must be expressed that the Soviets would parade their first operational solid ICBM before deployment.

Photographic evidence which could indicate a liquid-fueled vehicle is as follows:

a) The absence of any structures at the deployed complexes which might be regarded (from U.S. experience) as peculiar to solids.

b) The presence at several sites at Olovyannaya and Perm of two small earth mounds near the silo. Similar mounds at each site cover small structures, however it is conceivable that these two additional mounds seen at some sites could obscure tankage.

c) The presence at Launch Site L-1, Tyuratam Missile Test Center, of five apparently cylindrical objects, which conceivably could be tanks.

4. Analysis of [] and 2 has not been completed, but several differences between the sites at Perm and the other Type III-D complexes have been observed (Figure 31). These include:

a) Several sites whose road configuration does not resemble those at any other complex.

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b) The presence of a relatively large, possibly arched-roof building (approximately 70 feet by 20 feet) at several of the sites. (It is possible that such a building is also present at Olovyanaya Launch Site D-4.)

c) Twenty-one months after the initiation of construction of the Type III-D sites at Perm, there has still been no interferometer or group of barracks-buildings identified which would indicate a control site.

d) The presence, early in construction, of a medium-sized building seemingly associated with the site, but at some distance from it outside of the fence line.

e) The placement of two small equally sized earth mounds, one on each side of the level access road and either to the front or to the rear of the silo, instead of both being on the same side of the road and to the front of the silo.

These, and possibly other differences, are impossible to evaluate until a significant number of sites have been seen complete. They may be of major significance, or may simply be minor variations dictated by terrain or other considerations.

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See List of Illustrations

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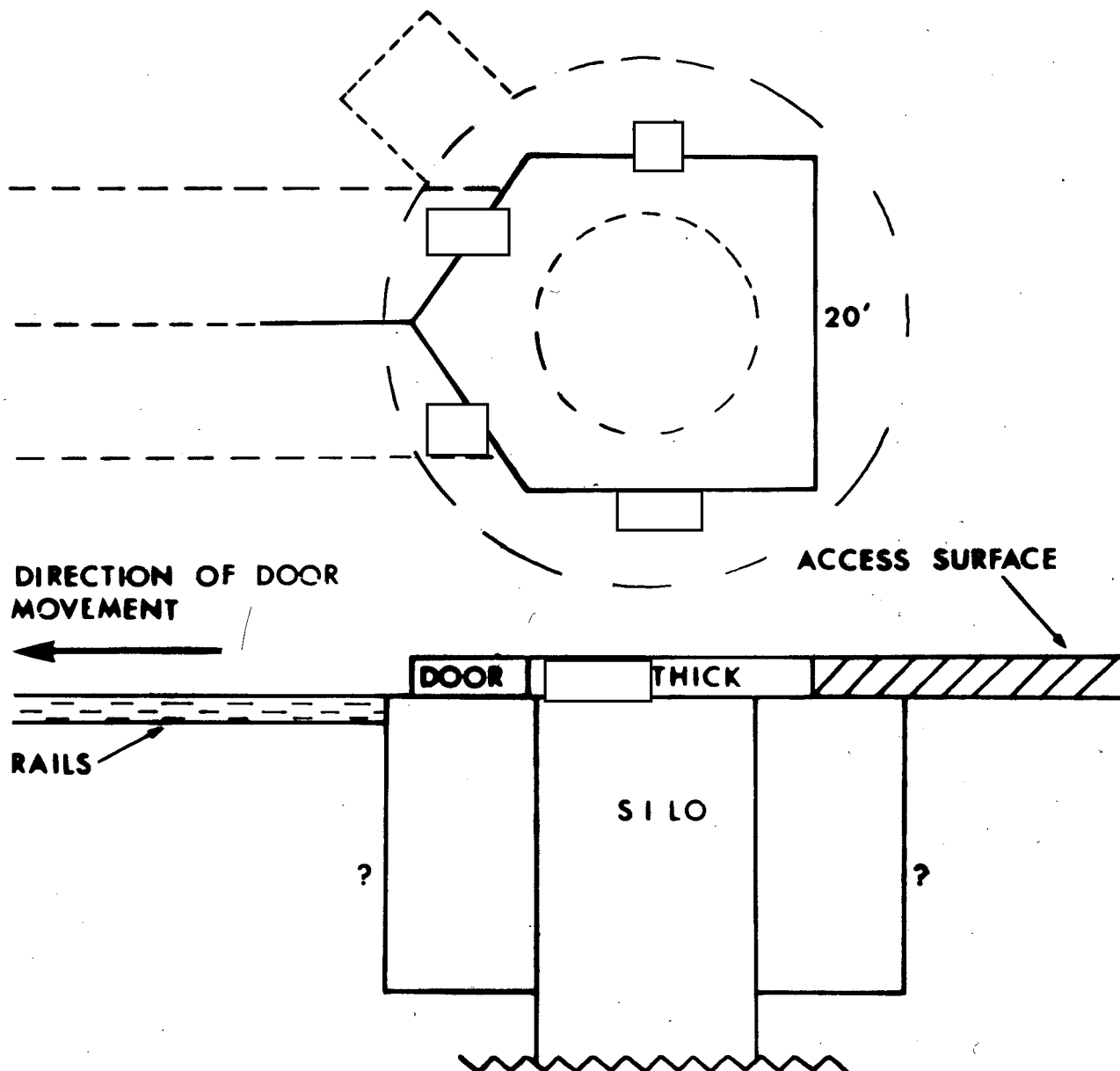
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ADDENDUM

On [] excellent quality [] stereo coverage was obtained of four of the Type III-D sites at Launch Group L, Tyuratam Missile Test Center. The sites observed are complete and for the first time at this type of site, the presence of silo doors can be confirmed (Figure 32). All doors observed in the L Group were closed on this coverage and they appear to be nearly flush with the level access surface. The silo doors at Tyuratam G-8 and 9 were open on this mission and appear to have the same configuration as those in the L Group. The doors at G-8 and 9 are estimated to be [] feet thick.



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TYPE III D ICBM LAUNCH SITE

Launch Site L-7

Tyuratam Missile Test Center

Silo Door



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STAGE X - FOURTEEN MONTHS

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